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# Relationship Between Personality And Exercise Motivation In Weight Loss

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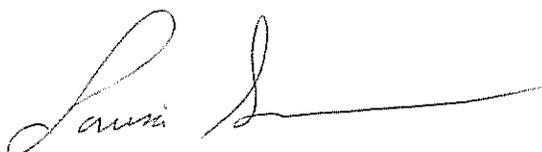
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RELATIONSHIP BETWEEN PERSONALITY AND EXERCISE MOTIVATION IN  
WEIGHT LOSS

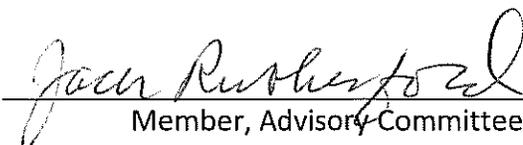
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## DEDICATION

This thesis is dedicated to Ryan Bowles and Amy Pohle for being supportive of me during this process and for making dinner on my late nights.

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## ABSTRACT

Previous research has investigated the relationship between motivation and personality in relation to exercise participation, while the purpose of this study was to examine the relationship between these two factors in relation to weight loss. Weight and fitness scores were measured initially and at 15 month follow-up. Participants completed personality and motivation inventories at follow-up. Contrary to the hypothesis, external motivation was positively correlated with weight loss; a finding that could be due to the program design or unique to weight loss. Neuroticism was positively correlated with external motivation and negatively correlated with identified regulation. Improved fitness score was negatively correlated with agreeableness and extraversion was positively correlated with weight loss. These results indicate that weight loss behavior is different from exercise behavior and needs to be further examined.

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## CHAPTER 1

### INTRODUCTION

According to the Centers for Disease Control, currently 69.2% of Americans are overweight or obese (Ogden, Carroll, Kit, & Flegal, 2012) and the number has continued to rise based on yearly reviews by the CDC (Currie, 2010). Obesity costs our nation more than \$147 billion dollars per year with each obese individual paying on average \$1,400 more per year in insurance costs than an individual of normal weight (Currie, 2010). Being overweight or obese is associated with increased risk of hypertension (Vernooij, van der Graaf, Visseren, & Spiering, 2012), cancer (Vucenik & Stains, 2012), cardiovascular disease, diabetes (E. Williams et al., 2012), complications with asthma (West, Burton, & Bell, 2011), joint problems, depression, sexual dysfunction and labored breathing (Gorman, 2012). Weight loss of even 5-10% of body weight has been shown to improve the risk factors for cardiovascular disease and improve health-related quality of life (Pan, Cole, & Geliebter, 2011; Wing RR et al., 2011). Exercise has been shown to increase psychological well-being, cure disease (Vina, Sanchis-Gomar, Martinez-Bello, & Gomez-Cabrera, 2012), improve quality of life (Chu-Hsin Huang, Li-Yueh Lee, & Man-Ling Chang, 2007), and improve bone density (Smith et al., 2012) among countless other positive findings.

With a problem of this magnitude plaguing the country, better understanding the individuals who are interested in and successful at losing weight and increasing exercise participation may help in addressing the problem on a larger scale. Measures

of personality have been applied in weight loss and exercise settings to determine the relationship between individual behavior change and various personality traits (Carlos Poston II & Ericsson, 1999; Hjördis, Gunnar, & Daisy, 1989; Magee & Heaven, 2011; Munro, Bore, Munro, & Garg, 2011; Sullivan, Cloninger, Przybeck, & Klein, 2007; Terracciano et al., 2009). Research has shown that individuals who are overweight and obese score lower on conscientiousness (Terracciano et al., 2009) and higher on extraversion (Magee & Heaven, 2011). Obese individuals scored higher on novelty seeking and lower on persistence and self-directedness than lean individuals (Sullivan et al., 2007). In the 2007 study by Sullivan et al., not only were there personality differences between overweight and lean individuals, but there were differences between overweight individuals who volunteer to participate in weight loss programs and those who did not.

Among the measures of personality, the Five Factor Model of Personality has shown positive associations with healthful behaviors (Chu-Hsin Huang et al., 2007; Ingledew & Markland, 2008; Ingledew, Markland, & Sheppard, 2004; Lewis & Sutton, 2011; Magee & Heaven, 2011; Munro et al., 2011; Terracciano et al., 2009). The factors measured by the Five Factor Model include: openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability (often referred to as neuroticism) (Costa & McCrae, 1992). Individuals with higher levels of positive personality traits have been shown to have significantly higher levels of motivation and exercise participation (Chu-Hsin Huang et al., 2007; Lewis & Sutton, 2011)

In addition to personality traits, Social Determination Theory has been applied to the study of health behaviors to better understand underlying motivations (Egli, Bland, Melton, & Czech, 2011; Ingledew & Markland, 2008; Ingledew et al., 2004; Kirkland, Karlin, Stellino, & Pulos, 2011; Lewis & Sutton, 2011; G. C. Williams, Grow, Freedman, Ryan, & Deci, 1996). The Social Determination Theory (SDT) of motivation examines an individual's motives in an effort to identify the degree of self-determination (Deci, 2000). SDT proposes a continuum of motivations with varying levels of autonomy ranging from intrinsic to extrinsic. Intrinsic motivation is when the reason for a behavior is fully integrated into one's sense of self and extrinsic motivation is when an individual is motivated by external rewards or an end result and not because the activity is satisfying in itself (Deci, 2000). There are four types of motivation along the spectrum. The least autonomous, externally regulated behavior is performed only for an external reward or for a reason that someone else has imposed on you. Introjected regulated behavior is performed for external reasons, but these reasons have been internalized by the individual. Identified regulated behavior is performed to complete outcomes that are personally valuable for the individual. The most autonomous is intrinsically-regulated behavior, in which the behavior is performed due to the inherent enjoyment one receives in participating in the activity (Deci, 2000; Ingledew et al., 2004).

Two studies found that enjoying exercise or being intrinsically motivated is most effective for increasing the level of exercise; another study found the same result relative to weight loss (Kirkland et al., 2011; Lewis & Sutton, 2011; G. C. Williams et al.,

1996). Individuals who were autonomously motivated were more active in a weight loss program, were more successful in losing weight initially, and were more successful at maintaining weight loss almost two years later (G. C. Williams et al., 1996). Conversely, two studies found that an increase in external motives led to a decrease in exercise participation (Ingledeu & Markland, 2008; Lewis & Sutton, 2011).

Research studies investigating personality and motivation concurrently have found relationships between the two in regards to health behaviors. One study found that individuals who are higher on openness to experience and extraversion are more likely to be motivated by intrinsic motives, while individuals who are higher on neuroticism are motivated by extrinsic factors (Ingledeu et al., 2004). A later study showed openness to experience and extraversion being linked to intrinsic motives, but also that these motives led to an increase in exercise participation (Ingledeu & Markland, 2008).

Personality and motivation measures have been previously investigated in relation to weight loss, exercise, and other health behaviors. However, the relationship between personality and motivation has only been previously studied in relation to exercise behavior. This study examines the relationship between personality and motivation in the area of weight loss by measuring both weight and change in fitness over time. Better understanding how these factors interplay may give insights into individual differences in weight loss outcomes.

## **Hypotheses**

Hypothesis 1: Based on previous research of the Five Factor Model of personality related to various health behaviors, it is hypothesized that higher levels of positive personality traits, including extraversion, conscientiousness, agreeableness, openness to experience, and emotional stability (often referred to as neuroticism), will be related to weight loss.

Hypothesis 2: Based on previous research of the Self Determination of Motivation, it is hypothesized that those individuals who are motivated by more autonomous or intrinsic forms of motivation will have greater degrees of weight loss and improved fitness scores while those who are motivated by extrinsic motivation will have less weight loss and improvement in fitness scores.

Hypothesis 3: Based on previous research on the relationship between personality and motivation, it is hypothesized that the relationship between intrinsic motivation and weight loss is stronger for individuals high and extraversion and openness to experience than for other individuals. The relationship between extrinsic motives and weight loss is positive for individuals high on neuroticism and negative for other individuals.

## **Operational definition**

Weight loss is defined as the percentage of weight loss from initial weigh-in to final weigh-in.

The fitness score was calculated based on the number of categories of improvement for each individual. An individual who improved from the good category to the excellent category, one category of improvement, received one point. The categories of improvement for each of the measures within the fitness assessment are summed to give a final fitness score.

### **Assumptions**

This study assumes that losing weight is appropriate and healthy for all of the participants in the study. This study also assumes that participants will be honest in completing all questionnaires and will try to the best of their ability on the fitness assessments.

### **Limitations**

A limitation of this study is that the participants for the study are individuals who signed up to participate in a weight loss competition in 2011. Those individuals who participate in a competition to lose weight do not necessarily represent all of the individuals who want to lose weight or who are taking action to lose weight. Another limitation of the study is that individuals had to pay a \$20 fee to enroll in the program, possibly excluding those individuals who could not afford the entry fee for the program. A final limitation is that the program was employee sponsored, and there may have been individuals who did not participate in the program due to discomfort with sharing personal information with their employer.

## **Delimitations**

This study investigated only weight loss and improved fitness assessment and no other health behaviors related to weight loss. The population for this study was faculty and staff members at a southeastern university.

## CHAPTER 2

### REVIEW OF LITURATURE

#### **Introduction**

While the current study is interested in weight loss in particular, related research on other healthful behaviors will also be examined, including exercise participation and eating behaviors. Since weight loss can be a complex interaction of various healthy choices across an individual's life, it is assumed that research on exercise will be related to weight loss, and the same for healthy eating behaviors.

Extensive research has been conducted determining the link between personality traits and healthful behaviors. Another body of research has investigated the link between these same healthful behaviors and motivation. However, research identifying the relationship between of personality and motivation in regards to healthful behaviors is still relatively new. Due to the small body of research on the relationship between the two factors and healthful behaviors, a more thorough review of personality and motivation individually can be found below, followed by the available research on the relationship between the two factors.

#### ***Personality***

Research suggests that individuals who are overweight differ on personality inventories from those who are not overweight (Terracciano et al., 2009). Using the Five Factor Model of personality, Terracciano et al. (2009) investigated the link between

personality and underweight and overweight individuals in Italy (Terracciano et al., 2009). Assessing more than half of the population in one small area in Italy, 5693 individuals reported their height and had their weight and waist circumference measured initially and three years later. Participants were administered the Revised NEO Personality Inventory which measure the Big Five Factors of personality. To compare overweight and underweight groups, the standard Body Mass Index categories were used, underweight, BMI < 18.5; normal, BMI = 18.5-25; overweight, BMI = 25-30; and obese or severely obese BMI > 30. Confirming the hypothesis, the study found that individuals who were classified as underweight scored high on neuroticism and those that were overweight and obese scored low on conscientiousness. Facets of the five factors associated with overweight, obese, and measures of waist and hip circumference were high impulsivity and low order; specifically these two factors were also the best predictors of waist circumference three years later (Terracciano et al., 2009).

Researchers examined differences in personality between those who were overweight and those who were not, but also took it further, examining additional differences. The purpose of the Sullivan et al. (2007) study was threefold; first, to identify if obese individuals differed from lean individuals in their personality characteristics, second, to determine if obese participants who enrolled in the weight management program differed from those obese individuals in the community, and third, to determine if personality of those who were successful (lose at least 10% of

their body weight) in the weight management program differed from those who were not successful. This study compared 264 lean individuals and 56 obese individuals from the local community and 183 obese individuals enrolled in a 22 week weight management program. The Temperament and Character Inventory (TCI) was used to measure seven dimensions of personality, including novelty seeking, reward dependence, harm avoidance, persistence, self-directedness, self-transcendence and cooperativeness. The results indicate that there were differences in personality traits in all three areas of question. Comparing the obese and lean members of the community, it was found that the obese individuals scored higher on novelty seeking and lower on persistence, and self-directedness. Participants who were enrolled in the weight management program scored higher on reward dependence and cooperativeness than the obese members of the community. The individuals who were successful in the weight management program, scored lower on novelty seeking than those who were not successful in the program (Sullivan et al., 2007). Not only were there difference between those individuals who were overweight and those who were underweight (Terracciano et al., 2009), but this study also suggests that there are differences in personality between those who self-select to enroll in a program to lose weight and there are also personality differences between those who successfully lose weight and those who do not (Sullivan et al., 2007).

Previously mentioned studies investigated the personality differences between groups of individuals, while this next study investigated the association between

personality traits and behaviors. Hjördis, Gunnar, and Daisy (1989) investigated the association between eating behaviors, weight loss, and personality traits. The subjects were 107 obese patients enrolled in two different weight loss treatment programs. The Karolinska Scales of Personality test was used to measure personality traits of the patients prior to the treatment program. Two and a half years after the treatment, patients were given The Three-Factor Eating Questionnaire. The patients scoring high in the anxiety-proneness scales were more likely to experience hunger, and to greater degrees, than the patients low in the personality trait. Another interesting finding was a positive association between weight loss and the personality measure of socialization. This finding suggests that those patients who rated high on socialization found more social support and positive feelings towards the treatment group, which led to further success in the program (Hjördis et al., 1989). This study is significant in that it was one of the first to show a relationship between personality traits and weight loss.

Further examining the relationship between personality and obesity, Magee and Heaven (2011) were also interested in the relationship of the two variables and weight gain. Using the Five Factor model of personality, the researchers examined Australian adults initially and then two years later to investigate the relationship between personality, obesity and weight gain. The purpose of the study was to determine whether personality traits would be associated with the baseline BMI, whether personality traits would be associated with two year change in weight, and if age or sex would be a moderator of the associations. The results indicated that higher

conscientiousness was associated with a lower obesity at baseline, while agreeableness, neuroticism, and extraversion were associated with higher obesity rate at baseline. None of these findings were moderated by age, sex or other health factors. At the two-year follow-up, it was found that increased extraversion was associated with a greater chance of gaining more than 5% of body weight in the two years (Magee & Heaven, 2011). These results suggest that increased extraversion is associated with not only higher BMI at baseline, but also higher chance of gaining weight.

Understanding that a relationship exists between personality and weight, Carlos Poston II and Ericsson (1999) examined the ability of a personality measure to predict who would successfully lose weight and who would be able to sustain long-term weight maintenance. The subjects were 102 obese patients enrolled in an eight-week weight loss program. Prior to beginning the program, all participants were administered the Karolinska Scales of Personality (KSP). Weights were taken at the beginning of the program, after the eight-week program and at a three month and a 12 month follow-up. The program consisted of physical activity, nutrition, and education components, including a low-calorie diet and group classes to teach problem-solving and stress management. Patients were classified as relapsers (those who gained any weight during 12 month follow-up) or nonrelapsers (those who continued to lose or maintained loss at the 12 month follow-up). Weight gain at the three month follow-up was highly predictive of the relapse classification at the 12 month follow-up. There were no significant differences in the personality traits of individuals in the two classifications.

There were weak associations between several of the KSP scales at the 12 month follow-up; however, the data suggest that the KSP was not useful in predicting weight loss at eight week, three month or 12 month follow-up (Carlos Poston II & Ericsson, 1999). While this study was not able to predict weight loss and long-term maintenance using the KSP, the researchers suggested that other scales be used as the measure of personality in place of the KSP.

Further research tried to identify personality traits that could predict which of two weight loss treatments would be most appropriate for different individuals (Munro et al., 2011). Fifty-four participants with a BMI of 30-40 were separately recruited to follow what the authors called a “slow, healthy eating weight loss diet (HEWLD)” or a “fast, very low energy diet (VLED)” (Munro et al., 2011). Participants in the two treatment groups consumed approximately 1200-1400 calories per day for 12 weeks or 700 calories per day for 4 weeks, respectively. Weight was measured at the end of the 12<sup>th</sup> week for the HEWLD and at the end of the 10<sup>th</sup> week for the VLED to account for weight maintenance. Personality traits were measured at the start of the study by using the Tangney Self Control Scale and from the Five Factor Model, the Neuroticism, Conscientiousness, and Extraversion scales. The findings show no relationship between personality and weight loss in the participants following the HEWLD. However, there was a significant negative relationship between Conscientiousness and weight loss, as well as a significantly positive relationship between Neuroticism and weight loss in the VLED participants. These findings suggest that a person who is less conscientious and

more neurotic is more likely to be more successful losing weight on a fast, very restrictive diet with little food choice available (Munro et al., 2011).

## **Motivation**

Trying to understand that role of motivation in exercise participation, researchers investigated the impact of age, sex, and race on the motivation to exercise in a college student population (Egli et al., 2011). The study consisted of 2,199 college students enrolled in physical activity classes during their first two years of college. Since college students were being studied, the age groups were divided into >20 or <20 years old. The students were administered the Exercise Motivation Inventory-2 (EMI-2) to assess exercise motivators that play a role in participation, choice of activity, and how exercising makes them feel. The authors proposed that motives would differ based on age, sex, and race, but the hypotheses were non-directional. Of the 14 factors measured by the EMI-2, 12 of the subscales were significant regarding gender, eight of the subscales were significant for race, and 3 were significant for age. The study found that males exercise for intrinsic reasons such as strength, positive health, and enjoyment, while females exercise for extrinsic reasons such as weight management and appearance. Of the 14 factors measured, the most cited reasons for participating in exercise include positive health, ill health avoidance, appearance, strength, endurance, and weight management. Of the demographics measured, the largest difference in motivation was for gender. The findings suggest that males and females are motivated to exercise for different reasons. In developing a program to increase exercise

participation, understanding the differences in motivation between the males and females could lead to increased levels of participation (Egli et al., 2011).

Research on motivation and health behaviors investigated the association between the motivation factors of intrinsic motivation and diet and exercise frequency in individuals with type 2 diabetes (Ofstedal, Bru, & Karlsen, 2011). Specifically, the authors were interested in two factors of intrinsic motivation: ability expectations and values, both with respect to diet and exercise. The subjects were 425 individuals with type 2 diabetes aged 30-70 in Scandinavian countries. They were recruited to answer questions related to current diet and exercise behaviors, expectations about being able to successfully comply with diet and exercise recommendations, and perceived value of maintaining a recommended diet and exercise regimen. The scales measuring these three areas were the Summary of Diabetes Self-Care Activities, Diabetes Management Self-Efficacy Scale, and the Health Beliefs Scale, respectively. While only 25% of the subjects reported to following the recommended diet seven days per week, 70% reported the expectation to follow the diet and 95% recognized that doing so would provide personal value. Exercise behaviors showed similar results with only 8% reporting exercising daily while 80% believed in the personal ability to exercise daily and 95% recognized personal value in exercising. Even though the individuals believed in the personal ability to exercise and recognized a value in doing so, subjects exercised at very low levels. Those with higher levels of expectation for exercising were the subjects with the highest levels of exercise behaviors. The researchers suggested that these

results may have indicated that exercise behaviors could be increased by more focus on intrinsic motivation and making sure that patients understood diet and exercise recommendations (Ofstedal et al., 2011).

While a previously mentioned study focused on college age adults, a study by Kirkland et al. (2011) measured motivational factors for exercise in 209 older adults, aged 56-95 years. The authors proposed that those older adults who exercise would be significantly different than those older adults who don't exercise in the motivation factors that make up self-determination theory, including autonomy, competence, and relatedness. While self-determination theory includes the three psychological needs listed above, the theory also proposes a motivation continuum ranging from amotivation to intrinsic motivation with nonself-determined extrinsic and self-determined extrinsic motivation falling in between. The authors also proposed, based on the motivation continuum that older adults who exercise would be significantly different than those who don't exercise in whether motivated either by self-determined extrinsic motivation or intrinsic motivation. Participants were administered three self-report surveys. The Physical Activity Scale for Elderly Adults measures the amount of physical activity performed by older adults during a one week time frame. The Exercise Motivation Inventory-Revised Older Adult measures reasons for participating in exercise, specifically in older adults, and determines the individual's motivation on the amotivation to intrinsic motivation continuum. The final scale, the Basic Psychological Needs in Exercise Scale measures the level of autonomy, competency, and relatedness.

The results showed significant differences in all three basic psychological needs, autonomy, competency, and relatedness between exercisers and non-exercisers. Another significant finding was the difference between exercisers and non-exercisers in whether their reasons for exercising were intrinsically motivated, self-determined extrinsically motivated or nonself-determined extrinsically motivated. Of all of the findings, the strongest difference was in the level of intrinsic motivation that the adults had to exercise. This suggests that enjoying exercise is the most effective motivator for older adults; however, all three types of motivators made an impact on the level of exercise. This suggests that while intrinsic motivation is best, even self-determined extrinsic motivation (e.g., improvements in fitness level) and nonself-determined extrinsic motivation (e.g. appearance) are also effective at motivating older adults to exercise (Kirkland et al., 2011).

Interested in applying the theory of Self-Determination in the area of weight loss and weight loss maintenance, the authors of another study enrolled 128 patients into a six month weight loss program and followed up with the patients at 23 months (G. C. Williams et al., 1996). The program consisted of a very low calorie liquid meal replacement for 13 weeks and then gradual reintroduction of foods for the following 13 weeks. In addition to the restricted diet, the participants attended weekly group meetings led by a psychologist with mini-lectures presented by experts. The authors predicted that those participants who were enrolled in the program and losing weight for autonomous reasons would be more successful as measured by attendance at the

weekly meetings, weight loss, exercise frequency, and long-term maintenance of weight loss. Participants completed four scales. The General Causality Orientations Scale, measured participants level of autonomy. The Health Locus of Control scale, measured locus of control to exclude it as a factor influencing the level of success. The Health Care Climate Questionnaire measured the level of perceived support from those administering the program. Finally, the Treatment of Self-Regulation Questionnaire measured the reasons for continued participation in the program. The results confirmed the hypothesis; those whose motivation was autonomous were more active in the program and were more successful at losing weight initially and maintaining the weight loss at follow-up 23 months later (G. C. Williams et al., 1996).

### **Personality and Motivation**

The relationship between personality and the self-determination theory of motivation was applied to exercise behavior by Ingledew, Markland, and Sheppard (2004). The researchers were interested in understanding the underlying mechanisms that led to the relationship between personality and exercise, and proposed self-determination as a possible mechanism. To investigate the relationship, the authors measured 182 subjects who were maintaining exercise behavior, meaning exercising regularly for more than six months. To measure personality traits, the participants completed both the NEO Five Factor Inventory and the Psychoticism Scale from the Eysenck Personality Questionnaire. To measure self-determination, the participants completed the Behavioral Regulation in Exercise Questionnaire (BREQ). The four

subscales of the BREQ measure motivations for participating in exercise, specifically, External Regulation (motivation that is completely not self-determined, a motive someone else imposed upon you), Introjected Regulation (motivation that is external, but has been internalized by an individual, this is typically done to avoid feeling guilty), Identified Regulation (motivation to achieve outcomes that are valuable for the individual), and Intrinsic Regulation (motivation that stems from the inherent enjoyment in participating in the activity).

The results of the study indicated that individuals scoring high on neuroticism were more likely to be motivated by Introjected Regulation, external, yet internalized motivation. Those who scored high on Extraversion were motivated to exercise by Identified Regulation and Intrinsic Motivation or valuable outcomes and inherent enjoyment, respectively. Those who scored high on Openness were less likely to be motivated by External Regulation and more likely to be motivated by Intrinsic Regulation. Overall, the individuals who scored higher on Extraversion and Conscientiousness and lower on Neuroticism were more likely to be motivated to exercise by intrinsic factors. The authors suggested that individuals who score high on Extraversion are intrinsically motivated to exercise to fill their need for interacting with others. The authors also suggested that those individuals who score high on Conscientiousness are intrinsically motivated to exercise to fill their need for competence (Ingledeu et al., 2004).

A later study expanded on the previous research, this time investigating the relationship between personality, exercise motivation, exercise participation and quality of life (Chu-Hsin Huang et al., 2007). The authors proposed a model to describe the relationship between all of these variables. They predicted that personality would impact all of the other factors, motivation to exercise and actual exercise participation as well as quality of life. The authors also predicted that exercise motivation would have an impact on exercise participation behaviors which would then impact quality of life. This study measured 142 fitness center members in Taiwan, Europe and the United States. Personality was measured using the NEO Personality Inventory, which assesses the Five Factors of personality: emotional stability, extraversion, openness to experience, agreeableness and conscientiousness. Exercise motivation and quality of life were measured using items from the Exercise Motivation Inventory. Finally, participation in exercise was measured by participant self-report of frequency of exercise. The results from the study confirm all four of the proposed hypotheses. Those individuals with higher levels of positive personality traits had significantly higher levels of motivation, significantly higher levels of exercise participation and a higher quality of life. This means that an individual who scores high on emotional stability, extraversion, openness to experience, agreeableness and conscientiousness is more likely to have high levels of exercise motivation, high levels of exercise participation and a high quality of life. It was also confirmed that exercise motivation was a strong predictor of exercise participation. Likewise, exercise participation was a strong predictor of the individual's quality of life. For the purpose of the study, quality of life includes physical health,

psychological health, and sexual satisfaction. This study suggests that higher levels of positive personality traits may lead to an improve quality of life through increased exercise participation (Chu-Hsin Huang et al., 2007).

Proposing a similar model of the role of motives and personality on exercise behavior described earlier (Chu-Hsin Huang et al., 2007), the present study also included behavioral regulation as a component of the proposed model (Ingledeu & Markland, 2008). The authors proposed that personality influences an individual's motives to exercise, which then influences the individual's behavioral regulation in regards to exercise, which then influences actual exercise participation. Behavioral regulation, as discussed earlier in the literature review, includes a continuum ranging from external regulation to intrinsic regulation, where as an individual moves along the continuum, motivation becomes less external and more internal or autonomous. Two hundred fifty-two office workers in England were assessed for level of personality, exercise motivation, behavioral regulation, and exercise participation. These components were measured using public domain items from the International Personality Item Pool as proxy for the NEO Five-Factor Inventory, Exercise Motivations Inventory-2, Behavioral Regulation in Exercise Questionnaire, and a questionnaire equivalent to the Leisure Time Exercise Questionnaire, respectively. Results showed that personality traits impacted motives. Also, motives were shown to impact regulation and in turn, participation. Specifically, neuroticism was shown to increase the appearance/weight motive. An increased appearance/weight motive was shown to increase external

regulation, which led to a decreased level of participation. This suggested that the appearance/weight motive may decrease the level of exercise participation. Openness to experience led to an increase in the health/fitness motive. Having an increased health/fitness motive was shown to increase an identified regulation and in turn, increase participation. The motive for social engagement led to an increased intrinsic regulation. Conscientiousness had no impact on motives, but decreased both external and introjected regulation. Based on this study, an appearance/weight motive, or higher neuroticism, leads to decreased participation and both the health/fitness, or higher openness to experience, and social engagement motives may lead to increased participation in exercise (Ingledeu & Markland, 2008).

A final study on the interaction between motivation and personality in predicting frequency of exercise measured 100 members of a university gym (Lewis & Sutton, 2011). The authors predicted that personality is a partial predictor of exercise frequency mediated through the factor of motivation. To test this hypothesis, the authors measured each of the participants on the Five-Factor traits of personality using questionnaire items from the International Personality Item Pool, exercise motivation using the Behavioral Regulation in Exercise Questionnaire; and a Likert scale question asking about exercise frequency. All five factors of personality were positively related to exercise frequency, with the strength and direction of the relationship directly related to the level of autonomy, the more autonomous, the stronger the correlation with exercise frequency. The strongest predictors of exercise frequency were identified as

extraversion, conscientiousness, and agreeableness. Those participants high on external behavioral regulation and amotivation had lower levels of exercise participation, confirming the theory that more autonomous forms of motivation will predict exercise frequency. An interesting finding from this study was that agreeableness has a direct impact on frequency of exercise, with a lower level of agreeableness predicting greater exercise frequency. The authors interpreted this finding by suggesting that some degree of self-centeredness is required to regularly spend time exercising (Lewis & Sutton, 2011).

## CHAPTER 3

### METHODS AND PROCEDURES

#### Participants

The participants were 25 individuals who participated in a 12-week Biggest Loser Competition hosted by the employee wellness program at a midsize university in the southeastern United States. The mean age of these participants was 42.5 years (SD 12.37) and 84% were female. Participants reported exercising approximately 3 hours per week. Participants volunteered for an initial weight loss program and paid a minimal fee to participate. Twenty-seven participants completed the follow-up portion of the study, which included the survey, fitness assessment, and measurement of participant mass 17 months after the initial assessment. These individuals serve as a comparison group for the experimental condition. The mean age of these participants was 38.7 years (SD 10.64) and 74% were female. Participants reported exercising approximately 4.5 hours per week.

#### Procedure

After signing the consent form, participants completed the fitness assessment consisting of measuring mass, waist circumference, push-up, plank, wall-sit, and three minute step test. The participants then completed the questionnaire consisting of the following inventories, International Personality Item Pool, Exercise Motivation inventory-2, Behavioral Regulation in Exercise Questionnaire-2.

## **Instruments**

To measure the five factors of personality, 50 items from the International Personality Item Pool (Goldberg, 1999) were used as alternatives to the commercial NEO Five Factor Inventory (Costa & McCrae, 1992). Participants indicated their level of agreement with each statement on a five point Likert scale from Very Inaccurate (1) to Very Accurate (5). A previous study found Cronbach alphas were all above .7, indicating reliability of the instrument (Nunnally, 1978): Extraversion .87, Agreeableness .82, Conscientiousness .79, Emotional Stability .86, Openness to Experience .84, and Total .84 (Nunnally, 1978).

The Exercise Motivations Inventory version 2 (Markland & Ingledew, 1997) was used to measure participation motives. The inventory measures 14 scales including: stress management, revitalization, enjoyment, challenge, social recognition, affiliation, competition, health pressures, ill-health avoidance, positive health, weight management, appearance, strength and endurance, and nimbleness. The 51 items include either 3 or 4 items for each of the 14 scales. Participants indicated their level of agreement with each statement on a five point Likert scale from Not at all true for me (1) to Very True for me (5). Of the 14 subscales, a previous study found the Cronbach alphas range from .68-.91 with only one of the 14 scales falling below .81 suggesting reliability (Markland & Ingledew, 1997).

The Behavioral Regulation in Exercise Questionnaire-2 (Moustaka, Vlachopoulos, Vazou, Kaperoni, & Markland, 2010) was used to measure the type of exercise

motivation, amotivation, external regulation, introjected regulation, identified regulation, or intrinsic regulation. The participants indicated their level of agreement with each of the 19 items on a five point Likert scale from Not at all true for me (1) to Very True for me (5). A previous study found the Cronbach alphas for the 5 subscales to be .83, .79, .80, .73, and .86 respectively indicative of reliability (Moustaka et al., 2010).

In addition to the above three inventories, the participants were asked demographic information and two questions regarding their level of current exercise participation, number of hours and days engaged in exercise per week.

### **Fitness Assessment**

The fitness assessment, completed by each of the participants, included measurements of mass, waist circumference, push-up, plank, wall-sit, and the three minute step test of cardiorespiratory fitness. Mass was measured in pounds using a digital scale. Waist circumference was measured in inches using a seamstress measuring tape; waist circumference category was assigned based on the norms included with the protocol (York, 2006). Push-ups were measured in number of completed push-ups on the toes for men and on the knees for women; push-up category was assigned based on the norms included with the protocol (York, 2006). Push-ups were continued until the participant could not complete another push-up or broke form. The only required equipment was an exercise mat. Plank was measured in seconds using a stopwatch; plank category was assigned based on the norms provided

with the protocol (Heywood, 2002). The plank was continued to failure. Wall-sit was measured in seconds using a stopwatch with the participant using a flat, bare wall as a brace for their back; wall-sit category was assigned based on the norms (Heywood, 2002). The wall-sit was held until the individual could not hold it any longer. No other equipment was necessary. The three minute step-test was measured in number of heart beats in one minute; three minute step-test category was assigned based on the norms (York, 2006). Required equipment was a 12" aerobic step, a stopwatch, and a metronome at 96 beats per minute. Participant stepped up and then down on the aerobic step for 3 minutes to the beat of the metronome. Immediately following the three minute count, the participant sat on the step, found their heartbeat and counted for a full minute.

### **Statistical Analysis**

The statistical analysis to be used in this study include basic descriptive statistics (mean and standard deviation) a Mann-Whitney U test to compare the difference in groups, and a forward multiple regression,  $p \leq .05$ .

## CHAPTER 4

### RESULTS

The two groups, the experimental group, which were tested in 2011 and 2013 ( $n = 25$ ) and the comparison group, which was tested only in 2013 ( $n=27$ ) were compared using a Mann-Whitney U nonparametric test and the results indicate that the two groups were not significantly different in age, hours of exercise reported per week, days of exercise reported per week, weight, any of the five personality traits, or any of the five motivation regulations at the time of testing. This suggests that the participants in the experimental condition were not unique and despite using a convenience sample, were representative of other similar groups.

Personality, motivation, weight loss, and fitness score were correlated to identify relationships between the variables. See Table 1 for correlations. External motivation and extraversion were positively correlated with weight loss,  $r = .36, p < .03$  and  $r = .4, p < .02$  respectively. Neuroticism was correlated with three of the motivation regulations; neuroticism was positively correlated with external motivation ( $r = .52, p < .004$ ) and amotivation ( $r = .386, p < .028$ ), while negatively correlated with identified regulation ( $r = -.38, p < .03$ ).

Improved fitness score was negatively correlated with agreeableness ( $r = -.48, p < .008$ ); indicating that individuals who made greater improvements in fitness assessment scored lower on the agreeableness scale.

A forward multiple regression was conducted with variables for personality (extraversion, conscientiousness, neuroticism, openness, and agreeableness), motivation (external, introjected, identified, intrinsic, and amotivated), weight loss, and fitness assessment improvement. Extraversion explained a significant proportion of variance  $F(1, 23) = 4.37, p < .04$ .

Table 1  
Correlations of personality, motivations, weight

Variable	Mean	SD	Correlations														
			1	2	3	4	5	6	7	8	9	10	11	12			
1. Weight Loss	4.10	20.48															
2. External	1.60	.59	.35*														
3. Introjected	2.92	.84	-.15	.29													
4. Identified	3.83	.67	-.26	-.49	.20												
5. Intrinsic	2.88	1.14	-.16	-.33	.17	.64											
6. Amotivated	1.54	.84	.20	.61	-.02	-.48	-.51										
7. Extraversion	3.13	.34	.40*	.11	.00	-.17	-.07	-.05									
8. Conscientiousness	3.11	.35	.04	-.03	-.07	-.24	-.25	.18	.04								
9. Neuroticism	2.86	.44	-.06	.51**	.19	-.37*	-.21	.38*	.39	-.13							
10. Openness	3.35	.30	-.01	-.09	.07	.01	-.21	-.07	.20	-.03	.24						
11. Agreeableness	3.12	.27	.30	.21	.28	-.04	.00	.02	.62	.20	.27	.18					
12. Fitness Score	2.88	3.47	.00	-.23	-.22	-.06	-.32	-.05	-.28	.06	-.22	.12	-.47**				

possible score is 1, maximum 4.  $p < .05$ , \*\* $p < .01$

## CHAPTER 5

### DISUCSSION

Personality and motivation have been previously investigated separately in relation to weight loss, exercise, and other health behaviors. However, the relationship between of personality and motivation has only been previously studied in relation to exercise behavior.

Based on previous research on personality and exercise, it was hypothesized that those high on all positive personality factors would have higher weight loss and improved fitness scores. The results indicate that high scores on extraversion were associated with increased weight loss, a finding similar to Lewis and Sutton's (2011) work examining exercise frequency. However, since this study examined participants in a weight loss competition, it could be that those who were extraverted were more successful due to the structure and design of the program. The program may have been more beneficial for those individuals who were more motivated by the social components and therefore were more successful.

Contrary to the hypothesis, but supported by a previous finding (Lewis & Sutton, 2011), individuals who made the greatest improvement in fitness assessment scored lower on the agreeableness scale; suggesting that individuals need some degree of self-centeredness to spend time on their own personal health and fitness. This finding suggests that for those individuals who are high on agreeableness, the benefits of

weight loss and improving health status may need to be emphasized. Concern for others may be a factor that makes these individuals less successful at losing weight or improving fitness level. Explaining how the weight loss may benefit family and friends may be a successful strategy for those individuals who are high on agreeableness. The remaining personality traits were not associated with weight loss.

Based on previous research on motivation and exercise, it was hypothesized that those who were intrinsically motivated would have higher weight loss and improved fitness scores. Contrary to the hypothesis, external motivation was significantly correlated with weight loss, suggesting that individuals who were motivated by external sources had higher degrees of weight loss. This finding could be due to the fact that the participants volunteered to participate in a weight loss competition. The competition and structure of the program could have motivated those individuals who were more externally motivated and discouraged those participants who were more internally motivated. This finding could also suggest that weight loss behavior is very different from exercise behavior. While internal motivation may be important in maintaining exercise behavior, external motives may be important to those individuals who are successful in losing weight.

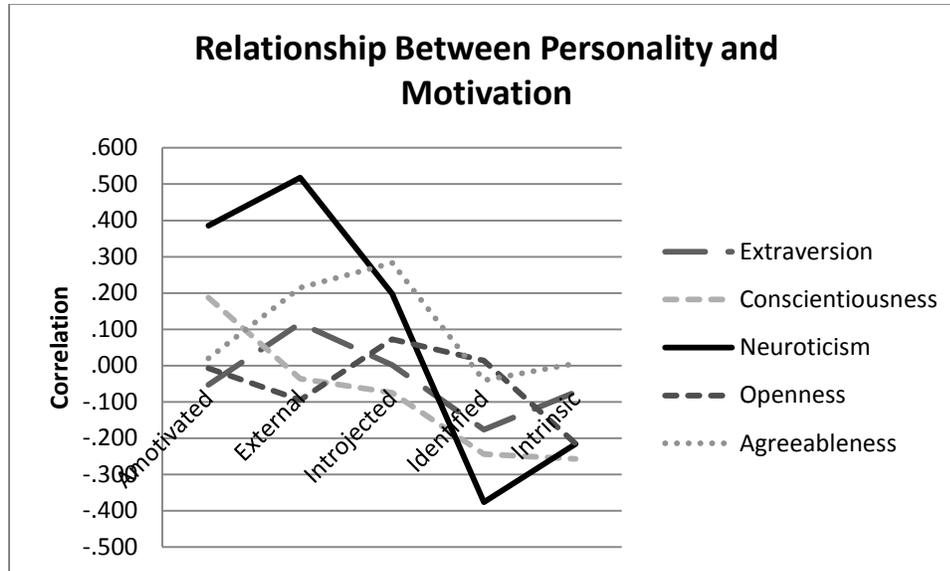
It is also possible that weight loss needs to be initiated and triggered by external motivation. But what is unclear is whether these individuals need to transition to internal motivation to continue to be successful or maintain a weight loss, as we see in the research on exercise behavior. Future research should investigate whether an

individual transitions to internal motivation or continues to be motivated by external sources is a distinction that makes an impact on long-term weight loss maintenance.

Based on previous research on the relationship between personality and motivation in relation to exercise, it was hypothesized that individuals who scored high on the personality trait of neuroticism would be motivated by external motivation and individuals who scored high on other personality characteristics would be motivated by internal motivation. This hypothesis was partially supported by the results, see Figure 1. Individuals who scored higher in neuroticism were more likely to use external motivation regulation than were individuals high on any of the other personality traits. While the hypothesized relationships related to openness and extraversion weren't significant, the hypothesized relationship regarding neuroticism was present. Neuroticism was positively correlated with amotivation and external motivation, while also being significantly negatively correlated with internal motivation. This is similar to a finding of Ingledew, et al. (2004). The implications of this finding are not well understood and will require further research on how personality relates to motivation regulation over time as weight loss progresses.

Despite not being well understood, a possible implication of this finding is that individuals who are high on neuroticism may be more likely to participate in programs that are based on external motivations for changing behavior. However, further research should investigate whether this combination of external motives and high neuroticism is actually beneficial for the participants. Just because these individuals are

highly externally motivated does not necessarily mean that this is the best combination of personality and motivation for success.



**Figure 1. Relationship Between Personality and Motivation**

While this present study was interested in the effects of personality on weight change, it is also worth noting a study that examines the opposite: the effect of weight change on an individual’s personality (Rydén et al., 2004). Researchers studied severely obese subjects; at the two year follow-up, changes that were identified in personality traits were directly related to the magnitude of weight loss. The more weight a patient lost, the lower their score on the anxiety proneness scale. However, that finding was not true for all personality traits; monotony avoidance increased for all participants, regardless of weight loss and impulsiveness remained unchanged. The authors acknowledged that a thorough understanding of the relationship between personality, obesity and weight loss is currently lacking. It is not clear how these factors interplay

with each other, so further research is warranted. Since research has documented changes in personality after significant weight loss, this fact must be considered in any research regarding both personality and weight loss.

Another study on the relationship between personality and body mass index (BMI) hypothesized that the relationship between these variables would vary based on gender (Faith, Flint, Fairburn, Goodwin, & Allison, 2001). Higher BMI for women was significantly associated with higher neuroticism and lower extraversion. On the other hand, higher BMI for men was associated with higher extraversion and psychoticism. These results indicate that a higher BMI for a man is potentially a positive personality attribute, while a higher BMI for a woman is potentially a negative attribute personality. While the current study did not identify a gender difference in personality traits, initial differences in personality traits based on gender may play a role in future studies.

Weight and weight loss are complicated and nuanced, which may have played a role in why the previous research results on physical activity and other health behaviors do not directly translate to the current research on weight loss. Further research should take into account the potential for weight change to directly impact personality traits, as well as the initial perception of weight and specific types of motivation driving the change in weight.

A limitation of this study was that the participants were not measured for personality traits or motivation regulation at the beginning of the study. Only follow-up

measures of each were collected, meaning that possible changes in personality or motivation were not measured or accounted for.

Further research should investigate the initial motivation to lose weight, as the trigger for the initial weight loss may impact the motivation regulation and may be connected to individual personality characteristics. If weight loss is occurring over an extended period of time, it is expected that the motivation regulation could and would change over time.

This exploratory study suggests that previous research on exercise behavior cannot be directly applied to weight loss behavior. Individuals losing weight may be more motivated by external motivation regulation than individuals pursuing other types of healthy behaviors. Further research needs to be conducted to understand the complex relationship between motivation and personality in predicting weight loss.

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**APPENDIX A:**

Consent to Participate

## Consent to Participate in a Research Study

### EXPORLING THE INTERACTION OF PERSONALITY AND EXERCISE MOTIVATION IN PREDICTING WEIGHT LOSS

#### Why am I being asked to participate in this research?

You are being invited to take part in a research study on the effects of motivation and personality on weight loss. You are being invited to participate in this research study because of your participation in the Biggest Loser Competition hosted by Healthy You! at ECU in Fall 2011. If you take part in this study, you will be one of about 80 people to do so.

#### Who is doing the study?

The person in charge of this study is Leanna Bowles at Eastern Kentucky University. She is being guided in this research by Dr. Louisa Summer. There may be other people on the research team assisting at different times during the study.

#### What is the purpose of the study?

By doing this study, we hope to learn what types of behavioral regulation and motives may be most effective to motivating individuals with different personality traits.

#### Where is the study going to take place and how long will it last?

The research procedures will be conducted at Campus Recreation on the campus of Eastern Kentucky University. You will need to come to the Group Fitness Studio on either January 28 at 1:30-3:30pm or January 29 at 8-10am to complete the study. It will take about 30 minutes.

#### What will I be asked to do?

You will complete the same fitness assessments you completed at the start of the Biggest Loser Competition in September 2011. This includes weight, waist circumference, plank, push-up, wall-sit, and three minute step test. In addition to the fitness assessment, you will complete a 125 item questionnaire. The questionnaire will take about 10 minutes to complete.

#### Are there reasons why I should not take part in this study?

You should not take part in this study if your doctor has advised you to not engage in physical activity.

#### What are the possible risks and discomforts?

There are possibilities for discomfort due to engaging in physically activity, however, you will have no more risk of harm that you would have experienced in your initial experience completing the assessment.

#### Will I benefit from taking part in this study?

Your payment for participation in the Biggest Loser Competition in January 2013 will be waived for taking part in this study.

#### Do I have to take part in this study?

If you decide to take part in the study, it should be because you really want to volunteer. You will not lose any benefits or rights you would normally have if you choose not to volunteer. You can stop at any time during the study and still keep the benefits and rights you had before volunteering.

#### If I don't take part in this study, are there other choices?

---

If you do not take part in this study and still want to participate in the Biggest Loser, you will be responsible for the \$20 entry fee.

**What will it cost me to participate?**

There are no costs associated with taking part in this study.

**Will I receive any payment or rewards for taking part in the study?**

Your payment for participation in the Biggest Loser Competition in January 2013 will be waived for taking part in this study. If you should have to quit before the study is finished, you will still receive waiver of payment.

**Who will see the information I give?**

Your information will be combined with information from other people taking part in the study. When we write up the study to share it with other researchers, we will write about this combined information. You will not be identified in these written materials.

We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. For example, your name will be kept separate from the information you give, and these two things will be stored in different places under lock and key.

However, there are some circumstances in which we may have to show your information to other people. For example, the law may require us to show your information to a court. Also, we may be required to show information that identifies you to people who need to be sure we have done the research correctly; these would be people from such organizations as Eastern Kentucky University.

**Can my taking part in the study end early?**

If you decide to take part in the study, you still have the right to decide at any time that you no longer want to participate. You will not be treated differently if you decide to stop taking part in the study.

The individuals conducting the study may need to end your participation in the study. They may do this if you are not able to follow the directions they give you or if they find that your being in the study is more risk than benefit to you.

**What happens if I get hurt or sick during the study?**

If you believe you are hurt or if you get sick because of something that is done during the study, you should call Leanna Bowles at 859-622-7218 immediately. It is important for you to understand that Eastern Kentucky University will not pay for the cost of any care or treatment that might be necessary because you get hurt or sick while taking part in this study. That cost will be your responsibility. Also, Eastern Kentucky University will not pay for any wages you may lose if you are harmed by this study.

Usually, medical costs that result from research-related harm cannot be included as regular medical costs. Therefore, the costs related to your child's care and treatment because of something that is done during the study will be your responsibility. You should ask your insurer if you have any questions about your insurer's willingness to pay under these circumstances.

**What if I have questions?**

Before you decide whether to accept this invitation to take part in the study, please ask any questions that might come to mind now. Later, if you have questions about the study, you can contact the investigator, Leanna Bowles at [Leanna.Bowles@eku.edu](mailto:Leanna.Bowles@eku.edu) or 859-622-7218. If you have any questions about your rights as a research

volunteer, contact the staff in the Division of Sponsored Programs at Eastern Kentucky University at 859-622-3636. We will give you a copy of this consent form to take with you.

**What else do I need to know?**

By agreeing to participate in this study, you are giving us permission to use your previous data collected as part of the Biggest Loser Competition hosted by Healthy You! at EKU in Fall 2011.

You will be told if any new information is learned which may affect your condition or influence your willingness to continue taking part in this study.

*I have thoroughly read this document, understand its contents, have been given an opportunity to have my questions answered, and agree to participate in this research project.*

\_\_\_\_\_  
Signature of person agreeing to take part in the study

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed name of person taking part in the study

\_\_\_\_\_  
Name of person providing information to subject

**APPENDIX B:**

Questionnaire

## Questionnaire

Participant Number: \_\_\_\_\_

Below are phrases describing people's behaviors. Please use the rating scale to describe how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Please read each statement carefully, and then write in the number that corresponds to the number on the scale.

1	2	3	4	5
Very Inaccurate	Moderately inaccurate	Neither inaccurate or nor accurate	Moderately Accurate	Very Accurate

- |  |   |
|--|---|
| 1. ___ Am the life of the party.                               | 25. ___ Am not interested in other people's problems. |
| 2. ___ Like order.   | 26. ___ Have a rich vocabulary.                       |
| 3. ___ Make a mess of things.                                  | 27. ___ Am quiet around strangers.                    |
| 4. ___ Often feel blue.  | 28. ___ Worry about things.                           |
| 5. ___ Feel comfortable around people.                         | 29. ___ Leave my belongings around.                   |
| 6. ___ Keep in the background.                                 | 30. ___ Take time out for others.                     |
| 7. ___ Am full of ideas.                                       | 31. ___ Follow a schedule.                            |
| 8. ___ Seldom feel blue.                                       | 32. ___ Feel little concern for others.               |
| 9. ___ Have difficulty understanding abstract ideas.           | 33. ___ Get upset easily.                             |
| 10. ___ Don't mind being the center of attention.              | 34. ___ Do not have a good imagination.               |
| 11. ___ Have little to say.                                    | 35. ___ Have a vivid imagination.                     |
| 12. ___ Often forget to put things back in their proper place. | 36. ___ Don't talk a lot.                             |
| 13. ___ Am exacting in my work.                                | 37. ___ Make people feel at ease.                     |
| 14. ___ Feel others' emotions.                                 | 38. ___ Talk to a lot of different people at parties. |
| 15. ___ Use difficult words.                                   | 39. ___ Shirk my duties.                              |
| 16. ___ Get chores done right away.                            | 40. ___ Have frequent mood swings.                    |
| 17. ___ Pay attention to details.                              | 41. ___ Am relaxed most of the time.                  |
| 18. ___ Change my mood a lot.                                  | 42. ___ Am interested in people.                      |
| 19. ___ Get irritated easily.                                  | 43. ___ Have a soft heart.                            |
| 20. ___ Don't like to draw attention to myself.                | 44. ___ Start conversations.                          |
| 21. ___ Sympathize with others' feelings.                      | 45. ___ Am not really interested in others.           |
| 22. ___ Am quick to understand things.                         | 46. ___ Get stressed out easily.                      |
| 23. ___ Am not interested in abstract ideas.                   | 47. ___ Insult people.                                |
| 24. ___ Am always prepared.                                    | 48. ___ Spend time reflecting on things.              |
|  | 49. ___ Am easily disturbed.                          |
|  | 50. ___ Have excellent ideas.                         |

Below are a number of statements concerning the reasons people often give when asked why they exercise. Whether you currently exercise regularly or not, please read each statement carefully and indicate, by writing in the corresponding number on the scale, whether or not each statement is true for you personally, or would be true for you personally if you did exercise.

Remember, we want to know why you personally choose to exercise or might choose to exercise, not whether you think the statements are good reasons for anybody to exercise.

1	2	3	4	5
Not at all true for me				Very true for me

- |  |  |
|--|--|
| 51. ___ To stay slim   | 78. ___ To give me personal challenges to face   |
| 52. ___ To avoid ill-health                                      | 79. ___ To help control my weight  |
| 53. ___ Because it makes me feel good                            | 80. ___ To avoid heart disease   |
| 54. ___ To help me look younger                                  | 81. ___ To recharge my batteries   |
| 55. ___ To show my worth to others                               | 82. ___ To improve my appearance   |
| 56. ___ To give me space to think                                | 83. ___ To gain recognition for my<br>accomplishments  |
| 57. ___ To have a healthy body                                   | 84. ___ To help manage stress  |
| 58. ___ To build up my strength                                  | 85. ___ To feel more healthy   |
| 59. ___ Because I enjoy the feeling of exerting<br>myself        | 86. ___ To get stronger  |
| 60. ___ To spend time with friends                               | 87. ___ For enjoyment of the experience of<br>exercising                                       |
| 61. ___ Because my doctor advised me to<br>exercise              | 88. ___ To have fun being active with other<br>people  |
| 62. ___ Because I like trying to win in physical<br>activities   | 89. ___ To help recover from an illness/injury   |
| 63. ___ To stay/become more agile                                | 90. ___ Because I enjoy physical competition   |
| 64. ___ To give me goals to work towards                         | 91. ___ To stay/become flexible  |
| 65. ___ To lose weight   | 92. ___ To develop personal skills   |
| 66. ___ To prevent health problems                               | 93. ___ Because exercise helps me to burn<br>calories  |
| 67. ___ Because I find exercise invigorating                     | 94. ___ To look more attractive  |
| 68. ___ To have a good body                                      | 95. ___ To accomplish things that others are<br>incapable of                                   |
| 69. ___ To compare my abilities with other<br>peoples'           | 96. ___ To release tension   |
| 70. ___ Because it helps to reduce tension                       | 97. ___ To develop my muscles  |
| 71. ___ Because I want to maintain good health                   | 98. ___ Because I feel at my best when<br>exercising   |
| 72. ___ To increase my endurance                                 | 99. ___ To make new friends  |
| 73. ___ Because I find exercising satisfying in<br>and of itself | 100. ___ Because I find physical activities fun,<br>especially when competition is<br>involved |
| 74. ___ To enjoy the social aspects of<br>exercising             | 101. ___ To measure myself against personal<br>standards                                       |
| 75. ___ To help prevent an illness that runs in<br>my family     |  |
| 76. ___ Because I enjoy competing                                |  |
| 77. ___ To maintain flexibility                                  |  |

We are interested in the reasons underlying peoples' decisions to engage, or not engage in physical exercise. Using the scale below, please indicate to what extent each of the following items is true for you. Please note that there are no right or wrong answers and no trick questions. We simply want to know how you personally feel about exercise.

1	2	3	4	5
Not at all true for me				Very true for me

102. \_\_\_ I exercise because other people say I should
103. \_\_\_ I feel guilty when I don't exercise
104. \_\_\_ I value the benefits of exercise
105. \_\_\_ I exercise because it's fun
106. \_\_\_ I don't see why I should have to exercise
107. \_\_\_ I take part in exercise because my friends/family/partner say I should
108. \_\_\_ I feel ashamed when I miss an exercise session
109. \_\_\_ It's important to me to exercise regularly
110. \_\_\_ I can't see why I should bother exercising
111. \_\_\_ I enjoy my exercise sessions
112. \_\_\_ I exercise because others will not be pleased with me if I don't
113. \_\_\_ I don't see the point in exercising
114. \_\_\_ I feel like a failure when I haven't exercised in a while
115. \_\_\_ I think it is important to make the effort to exercise regularly
116. \_\_\_ I find exercise a pleasurable activity
117. \_\_\_ I feel under pressure from my friends/family to exercise
118. \_\_\_ I get restless if I don't exercise regularly
119. \_\_\_ I get pleasure and satisfaction from participating in exercise
120. \_\_\_ I think exercising is a waste of time

#### DEMOGRAPHICS

121. What is your gender? \_\_\_\_\_
122. What is your height? \_\_\_\_\_
123. What is your age? \_\_\_\_\_
124. How many hours per week do you typically exercise? \_\_\_\_\_
125. How many days per week do you typically exercise? \_\_\_\_\_

**APPENDIX C:**

Biggest Loser Fitness Assessment

## Biggest Loser Fitness Assessment

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Personal Goal I want to meet during the Biggest Loser Challenge:

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	Result	Rating Category
Waist Circumference		
Ab Plank		
Push-ups/Modified Push-ups		
Leg Strength-Wall Squat		
3 Minute Step Test		

### Descriptions and Directions:

#### Disease Risk Based on Waist Circumference

A high waist circumference and too much abdominal fat puts you at high risk for type 2 diabetes, high blood pressure, high cholesterol, and heart disease. It means you need to lose weight. By measuring your waist circumference, doctors can track your body composition before, during and after your weight loss efforts.

To measure your waist circumference, use a tape measure. Start at the top of the hip bone then bring it all the way around—level with your navel. Make sure it's not too tight and that it is parallel to the floor. Don't hold your breath while measuring it!

Women	Men	Disease Risk
<32.5	<35.5	Low
32.5-35.0	35.5-40.0	Moderate
>35.0	>40.0	High

#### Ab Plank

Hold a full plank (push-up position, modification: on knees) for long as possible before form breaks or you are too tired to continue.

Rating	Women	Men
Fair	0-15 seconds	0-30 seconds
Below Average	16-30 seconds	31-60 seconds
Average	31-60 seconds	61-90 seconds
Good	61-90 seconds	91-120 seconds
Excellent	>90 seconds	>120 seconds

**Push-ups/Modified Push-ups**

Do as many push-ups as possible. When form breaks or you are too tired to continue the test is complete. Full push-ups legs extended; modified push-ups on your knees; must select only one push-up format.

Men	Very Poor	Poor	Fair	Good	Excellent	Superior
Age: 18-29	Below 22	22-28	29-36	37-46	47-61	Above 61
30-39	Below 17	17-23	24-29	30-38	39-51	Above 51
40-49	Below 11	11-17	18-23	24-29	30-39	Above 39
50-59	Below 9	9-12	13-18	19-24	25-38	Above 38
60 & over	Below 6	6-9	10-17	18-22	23-27	Above 27

Women	Very Poor	Poor	Fair	Good	Excellent	Superior
Age: 18-29	Below 17	17-22	23-29	30-35	36-44	Above 44
30-39	Below 11	11-18	19-23	24-30	31-38	Above 38
40-49	Below 6	6-12	13-17	18-23	24-32	Above 32
50-59	Below 6	6-11	12-16	17-20	21-27	Above 27
60 & over	Below 2	2-4	5-11	12-14	15-19	Above 19

**Leg Strength—Wall Squat**

Stand with back against the wall, feet out from wall; squat until knees are bent at a 90° (right angle) from the wall. Hold for as long as possible for up to 60 seconds.

Men						
Rating / Age	18-25	26-35	36-45	46-55	56-65	65+
Excellent	>49	>45	>41	>35	>31	>28
Good	44-49	40-45	35-41	29-35	25-31	22-28
Above Average	39-43	35-39	30-34	25-28	21-24	19-21
Average	35-38	31-34	27-29	22-24	17-20	15-18
Below Average	31-34	29-30	23-26	18-21	13-16	11-14
Poor	25-30	22-28	17-22	13-17	9-12	7-10
Very Poor	<25	<22	<17	>9	<9	<7

Women						
Rating / Age	18-25	26-35	36-45	46-55	56-65	65+
Excellent	>43	>39	>33	>27	>24	>23
Good	37-43	39-47	27-33	22-27	18-24	17-23
Above Average	33-36	29-32	23-26	18-21	13-17	14-16
Average	29-32	25-28	19-22	14-17	10-12	11-13
Below Average	25-28	21-24	15-18	10-13	7-9	5-10
Poor	18-24	13-20	7-14	5-9	3-6	2-4
Very Poor	<18	<20	<7	<5	<3	<2

### 3-Minute Step Test

Set a metronome to 96 beats per minutes and make sure you can hear the beat. Stand facing a 12 inch step. When ready, start the clock and march up and down the step to the metronome beat (up, up, down, down) for 3 minutes. You can rest if you need to, but remain standing. When 3 minutes are up, stop immediately, sit down on the step and count your pulse for one full minute.

Men						
Rating / Age	18-25	26-35	36-45	46-55	56-65	65+
Excellent	<79	<81	<83	<87	<86	<88
Good	79-89	81-89	83-96	87-97	86-97	88-96
Above Average	90-99	90-99	97-103	98-105	98-103	97-103
Average	100-105	100-107	104-112	106-116	104-112	104-113
Below Average	106-116	108-117	113-119	117-122	113-120	114-120
Poor	117-128	118-128	120-130	123-132	121-129	121-130
Very Poor	>128	>128	>130	>132	>129	>130

Women						
Rating / Age	18-25	26-35	36-45	46-55	56-65	65+
Excellent	<85	<88	<90	<94	<95	<90
Good	85-98	88-99	90-102	94-104	95-104	90-102
Above Average	99-108	100-111	103-110	105-115	105-112	103-115
Average	109-117	112-119	111-118	116-120	113-118	116-122
Below Average	118-126	120-126	119-128	121-126	119-128	123-128
Poor	127-140	127-138	129-140	127-135	129-139	129-134
Very Poor	>140	>138	>140	>135	>139	>134

Starting Weight: \_\_\_\_\_